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July 10, 2002

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street SW
Washington DC 20554

Re: ET Docket No. 98-153 -- Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems
Ex Parte Communication

Dear Ms. Salas:

Pursuant to Section 1.1206(a)(2) of the Commission's Rules, on behalf of the GPR Industry Coalition and the GPR Service Providers Coalition, I am filing this letter electronically to report oral ex parte communications in the above-referenced proceeding.

Yesterday, Don J. Evans of this office, representing the GPR Service Providers Coalition, Peter Annan, spokesman for the GPR Industry Coalition, and I, representing the GPR Service Providers Coalition, met (separately) with Bryan Tramont of Commissioner Abernathy's office, Paul Margie and Nguyen Vu of Commissioner Copps's office, and Sam Feder of Commissioner Martin's office.

In addition to the points reflected in the attached materials, we also discussed the need for interim relief as to equipment authorization while OET ramps procedures for certification.

If there are questions about this submission, please call me at the number above.

Respectfully submitted,

Mitchell Lazarus
Counsel for GPR Industry Coalition

cc: Meeting participants

Ground Penetrating Radar Industry Coalition
GPR Service Providers Coalition

FCC -- July 9, 2002

(The Ground Penetrating Radar Industry Coalition [GPRIC] consists of Geophysical Survey Systems, Inc., Mala Geoscience, Inc., Sensors & Software, Inc., and Underground Imaging Technologies, Inc. These companies account for over 95 percent of the ground penetrating radar units sold in the United States.)

(The GPR Service Providers Coalition is a broad-based ad-hoc coalition of over 30 organizations which employ GPR devices in a wide variety of applications.)

1. Short term relief requested

A. ***Permissible users***: Construe broadly enough to include all current applications (but not consumers).

B. ***Coordination***: Allow one-time, prior coordination for all except sensitive sites (such as airports and radio astronomy facilities).

C. ***Emissions levels***: Establish criteria for near-automatic waivers for GPRs that operate below the Part 15 general limits (may require mechanism for expedited NTIA approval).

D. ***"UWB bandwidth" rule***: Grant automatic waivers for GPRs that otherwise meet the GPR emissions limits (with expedited NTIA approval); otherwise handle under Item C, above.

E. ***Existing equipment***: Can safely be "grandfathered."

2. GPRs do not cause interference.

- The most zealous UWB opponents (Air Transport Association, PCS, amateur radio, and DARS)have conceded GPRs do not interfere .
- Most GPRs are designed to comply with existing Part 15 limits to minimize any potential for interference.
- Most GPR energy is emitted into the soil, where it dissipates as infinitesimal amounts of heat.
- There are few GPRs in use (only about 1,000 nationwide).

- Most GPRs operate only a small percentage of the time.

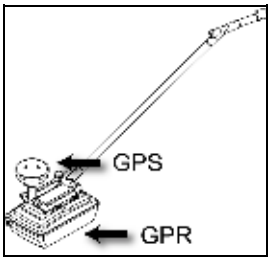
- The few GPRs that operate continuously for short periods do so in motion at high speed -- *e.g.*, inspecting highways -- and so are not an interference threat.

- Many applications occur in lightly populated areas.

- Systems made by GPRIC members have a pulse repetition frequency of 500 kHz or less, which NTIA has shown not to interfere even under very-worst-case conditions.

    - Most systems operate under 100 kHz, where NTIA was unable to detect any interference to GPS, even at UWB powers thousands of times higher than those NTIA proposed to the FCC.

- In particular, GPR does not interfere with GPS: many GPR systems routinely operate with a GPS receiver fixed directly to the unit, centimeters from the antenna. (See Figure 1).



GPR with Mounted GPS ¶
Figure 1

3. GPRIC has requested FCC reconsideration of four GPR rules.

These rules were adopted in violation of the Administrative Procedure Act:

A. ***Limiting GPR operation to certain users*** (Section 15.509(b)(1)): no APA notice and comment, and no support in the record.

B. ***Requiring prior coordination with NTIA*** (Section 15.525): no APA notice and comment, and no support in the record.

C. ***GPR emissions limits well below Part 15 general limits*** (Section 15.509(d)): adopted contrary to all of the relevant evidence in the record.

D. ***Requiring a GPR's "UWB bandwidth" to lie below 960 MHz*** (Section 15.509(a)): no support in the record, and yields the irrational result of *disqualifying* certain devices having far lower interference potential than

devices that pass. (Many uses for non-destructive testing, including landmine detection, require low-level operation into the 2 GHz to 3 GHz range.)

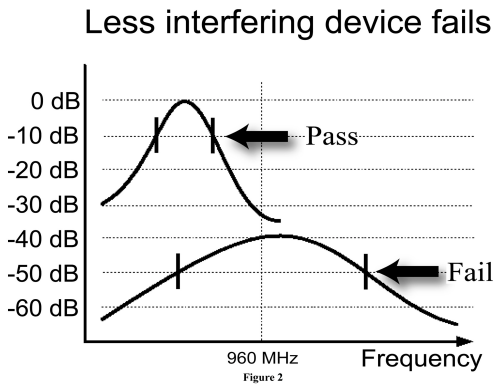


Figure 2

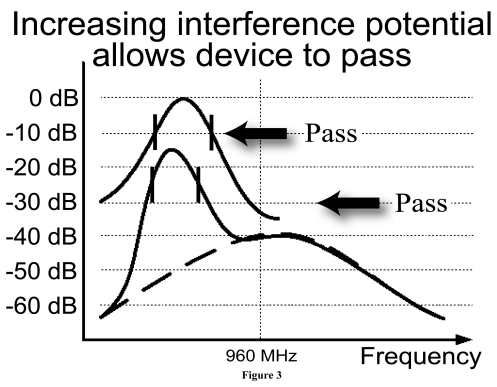


Figure 3

4. GPRIC has requested an interim stay of enforcement of these rules.

- Any of these rules would disable the GPR industry and eliminate the benefits of GPR (see attached list of applications).

- GPRIC has asked the FCC to stay enforcement of the challenged rules – specifically, to permit GPR manufacture and operation at the Part 15 general limits pending reconsideration.

- The request satisfies all legal criteria for a stay: likelihood of prevailing on the merits; irreparable harm if the stay is not granted; no harm to other parties from a stay; and public interest in the stay.

- Operation under the stay will not cause interference: GPRs have not caused interference in the past.

- But GPRIC will not object to (a) barring GPR operation by consumers, and (b) requiring coordination prior to operation near specific sensitive installations.

Appendix -- Examples of GPR Applications

Everyday GPR applications include:

- highway inspection to identify voids, pipes, and pavement thickness (essential for safety);
- bridge deck inspection for quality assurance condition assessment and maintenance decisions;
- airport runway inspection to find voids and evaluate pavement thickness -- used by NASA and all major airports (essential for safety);
- railroad bed inspection to find leaking pipes and voids (essential for safety);
- testing the soundness of subsurface environment before excavation (essential for safety);
- detection and 3-D mapping of pipes and utilities before excavation (essential for safety);
- geophysical surveys (locate bedrock, water table, and other geological properties; detect voids and anomalies);
- forensics (locating criminal evidence);
- environmental contamination surveys to determine location and extent of contamination, pipe leaks, waste pits, etc. (essential for safety);
- archaeology -- mapping of underground sites prior to digging;
- mining -- location of mineral deposits, seams, and water levels (essential for safety);
- measurement of ice thickness in rivers and lakes (essential for safety);
- under-ice Arctic and Antarctic research.

Once-in-a-lifetime GPR applications are no less important:

- discovery of the wooly mammoth in Siberia (Discovery Channel);

survey of unopened royal tomb in Xian, China;

discovery of unknown village near Macchu Pichu (National Geographic expedition);

surveys at Washington's Mount Vernon, Jefferson's Monticello, and FDR's home;

discovery of buried murder victims (some leading to convictions);

discovery of the emerald deposit in North Carolina, North America's largest;

location of the "Lost Squadron" in Greenland in 1992 (leading to the upcoming flight of the recovered P-38 aircraft, "Glacier Girl");

GPR system for Mars exploration, to define creek beds where remnants of life might be found.

Ground Penetrating Radar, Public Safety, and FCC 02-48

Presented by the
GPR Service Providers Coalition
May 22, 2002

Introductions

- GPR Service Providers Coalition
  - Doria Kutrubes (President, RSI)
  - Ken Maser (President, Infrasense)
  - Anthony Alongi (President, Penetradar)
  - Tim Bechtel (Principal Geophysicist, Enviroscan)
- Texas Department of Transportation
  - Carl Bertrand (TexDOT)
  - Tom Scullion (Texas A&M)
- Don Evans, FHH (attorney)

Outline of Presentation

- Objectives of Meeting
- Thumbnail History of GPR
- Description of GPR Equipment
- Public Safety Applications of GPR
- Impact of FCC Rules
  - On GPR Operations
  - On Small Businesses
- Compatibility of GPR with GPS
- Discussion of Recommendations

Objectives of Meeting

- Generate awareness of
  - the Scope and Nature of GPR Services
  - the organizations involved in these services
  - GPR focus on public safety
  - the impact of FCC02-48
- Understand FCC/NTIA concerns about GPR operations
- Seek some means to allow these valuable public services to continue

GPR Background

- Established for over 30 years
- No evidence that emissions have caused interference
- Primary focus is on Public Safety
- Primary providers are small companies (~350)
- Systems owned and used by State and Federal Agencies
- Established compatibility with GPS
- New FCC Rules will eliminate current GPR work

Thumbnail History of GPR

- Technology developed through DOD research initiatives in the '60 and '70s
  - Locate underground tunnels in the DMZ
  - Mine detection
- Formation of commercial companies to provide equipment and services to respond to need ('70's)
- Adaptation of equipment/methods to non-military needs (late '70's, '80s and '90s)

GPR Instrumentation

GPR System (computer)

GPR Antenna (1500 MHz)

GPR Equipment

Multiple 400 MHz Antennas

200 MHz antenna

GPR Equipment

1 GHz Dual Horn Antennas - Driving Speed Survey

GPR and Public Safety

- Highways, Bridges, and Tunnels
- Airfields
- Buildings
- Nuclear Facilities
- Underground Utilities
- Law Enforcement and National Security

GPR and Public Safety

- Highways (1.0-1.5 GHz Antennas)
  - Detection of incipient damage to pavements, airfields and bridge decks (avert accidents)
  - Evaluate road/bridge conditions without lane closures and exposure of personnel

Example of GPR for Highway Safety

So they closed the lane

The section collapsed by itself the next night

No one was hurt

April 1, 2002 in Austin, Texas
TxDOT predicted this with **GPR** after a water main break

GPR and Public Safety

May 12, 1988: I-93, Wilmington, MA

Voids observed in embankment and median due to Gas Pipeline Installation

GPR Detects Large Void under high speed lanes

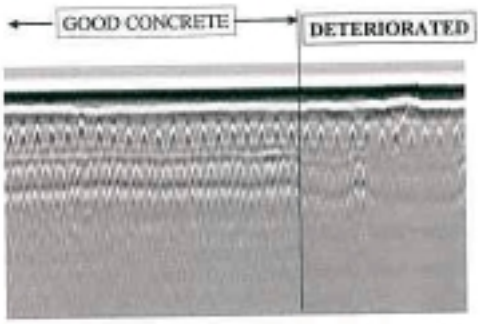
300 Cu yds of grout injected – catastrophic failure avoided

Borehole camera view of detected void

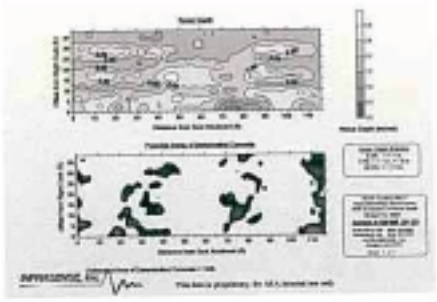
GPR and Public Safety

- Bridge Stability Assessment
  - Mapping of Concrete Deterioration and Delaminations (1.0-1.5 GHz Antennas)
  - Locating Structural Steel (1.0-1.5 GHz Antennas)
  - Determination of Abutment Thicknesses (for loading capacity assessment)
  - Scour Surveys

Bridge Stability Assessment



Bridge Stability Assessment



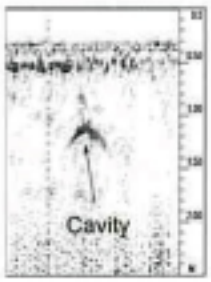
GPR and Public Safety
Bridge Stability Assessment

Locating rebar in a bridge pier, Fore River Bridge, Boston, MA
(1500 MHz antenna)

GPR and Public Safety

Tunnel Roof Stability Assessment

GPR and Public Safety



Tunnel Liner Void Survey (400 MHz antennas)

GPR and Public Safety

- Airfields
  - Detection of voids beneath runways to prevent collapse
  - Assessment of surface damage to prevent spalling
  - Location of utilities

GPR and Public Safety
Airfields

Detection of delaminated asphalt

Detection of voids under pavement

Airfield Surveys
Representative Locations

- United States Naval Academy
- Dulles International Airport
- Baltimore Washington International Airport
- Reagan National Airport
- Newark Airport
- Denver International Airport
- Patuxent Naval Air Station, MD
- Peterson AFB, Colorado Springs
- Dover AFB
- Arnold AFB

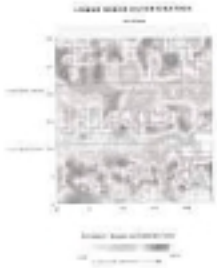
GPR and Public Safety

- Renovation of Buildings and Parking Structures (1.0-1.5 GHz)
  - Locating conduits to avoid accidental electrocution and fire
  - Preventing damage to communications systems
  - Identifying buried steel to prevent structural damage and collapse
  - Protection of workmen from exposure to unseen hazards

GPR and Public Safety
Conduit Detection

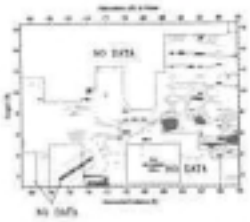
GPR is an integral tool used in preventing death and injury from Electrocution.

GPR and Public Safety
Building Roof Stability



Mapped Areas of Deteriorated Concrete, Town Hall, Leominster, MA

GPR and Public Safety



Structural Integrity of Concrete Holding Tank, Rumford, Maine

Jefferson Memorial - Washington D.C.

•U.S. Department of the Interior, National Park Service

•Front portico wall

•Structural steel investigation- GPR (1500 MHz antenna) to locate possible structural steel behind marble wall

GPR and Public Safety

Concrete Slab Assessment, Parking Garage

GPR and Public Safety

- DOD/DOE Nuclear Facilities(1.0-1.5 GHz)
  - Detecting utilities and electrical conduits during retrofit and renovations to prevent catastrophic damage
  - Void detection in critical areas (beneath slab and in containment structure)

GPR and Public Safety
Nuclear/Power Facilities

- Representative Nuclear Surveys
  - Toms River, New Jersey
  - Turkey Point, Florida
  - Nuclear 1 Power Plant, Russleville, Arkansas

Nuclear One Power Plant - Russellville, AR

- Concrete containment structure
- Map out vertical and horizontal rebar and post-tensioning cable ducts
- Locate safe hole locations to place anchor bolts for mounting a crane
- GPR (1500 MHz antenna) tests on preliminary mock-up and containment structure are successful
- GPR is crucial to avoid major catastrophe when drilling
- No photographs allowed

Tom Miller Dam - Austin, TX

- Lower Colorado River Authority (LCRA)
- Hydro-electric generating station on the Colorado River

- Dam Investigation - GPR (400 and 1500 MHz antennas) to locate rebar in upstream and downstream deck slabs and abutments and to measure concrete thickness

Grand Coulee Dam - WA

- U.S. Department of the Interior, Bureau of Reclamation, Building Seismic Safety Program
- Visitor Arrival Center

- Precast concrete panel connection evaluation- GPR (1500 MHz antenna) to locate possible metal connection between typical precast panels in walls and ceilings

GPR and Public Safety Utility Mapping

- Utilities (400-900MHz Antennas)
  - Mapping buried pipes to prevent fire, explosion, or water damage due to impact
- Detection and protection of fiber optic cables and Communication Lines (400 - 1500 MHz antennas)

Utility Mapping The Need for Clearances

Laclede County, MO,
June 6, 1989:
A 41 year-old backhoe operator died when he hit a 10-inch propane line.

Utility Mapping The Need for Clearances

Dig-safe Statistics

Utility Mapping
The Need for Clearances
GPR Survey

GPR and Public Safety

- Detection and protection of fiber optic cables and Communication Lines at:
  - The Pentagon
  - Miami International Airport
  - Logan Airport
  - New York City Police and Fire Station

GPR and Public Safety
Mapping Hazardous Waste

•Environmental Damage Mitigation (200-400 MHz Antennas)

–mapping of extent of underground chemical contamination

–Detection of buried drums leaking into the water supply

GPR and Public Safety
Preventing Railroad Derailments

GPR Usage for National Security

- UN Treaty Verification after Desert Storm in IRAQ
- Tunnel Detection in DMZ
- Land Mine/UXO Detection
- Maintains Interstate Highway System
- Law Enforcement

Impact of FCC 02-48 on GPR

Impact of FCC 02-48 on GPR

- All GPR Operations Must Cease because
  - Equipment operates above 960 MHz
  - Other equipment has not been tested by the new standards
  - Almost all current users are eliminated
  - Many applications can not meet 15 day approval

Impact of FCC 02-48 on Small Businesses

Suppliers of GPR Services

- GPR Service Companies
- State highway agencies
  - Texas, California, New Hampshire, North Carolina, Florida, Minnesota, Michigan, Missouri
- Federal agencies (examples)
  - USAF; Army Corps of Engineers; FHWA; Department of Agriculture; USGS; DOE; FBI; US Coast Guard

Impact of FCC 02-48 on Small Businesses

- Over 1000 GPR Systems in use today
- Over 350 businesses use GPR
- 95% of GPR Service Providers represent small businesses

Impact of FCC 02-48 on Small Businesses

- Rules as they stand will close many small businesses
  - Significant % of work in restricted band
  - Eligibility definitions are too restrictive
  - 15 day notification period is unrealistic and burdensome

Compatibility of GPR with GPS

- GPS is a standard component of GPR systems
- No evidence that GPR has ever, or will ever cause a problem with GPS
  - (see NTIA Report 01-383, p. 8-38)
- Verizon, Sprint state that GPR will not interfere with E911 GPS
  - they need conduit/utility detection for tower installation

Impact of GPR on GPS

GPR and GPS Compatibility

GPR/GPS Lock-on Tests

- Test 1 – No GPR Signal
- Test 2 – GPR in normal use (directed at asphalt pavement, 12 feet from GPS)
- Test 3 – GPR in normal use (directed at asphalt pavement, 8 feet from)
- Test 4 – GPR 1.5 feet away, pointed directly at GPS (unrealistic)

Compatibility of GPR with GPS

- GPS Lock-in interference is primary concern to E911 systems
- Tests show that 1.5 GHz GPR has no impact on GPS lock-on

GPR/GPS Lock-on Test Results

Test 1

trial	TTFF (sec.)
1	33
2	33
3	33
4	33
Average	33
Sigma	0

Test 2

trial	TTFF (sec.)
1	33
2	34
3	33
4	33
Average	33.25
Sigma	0.5

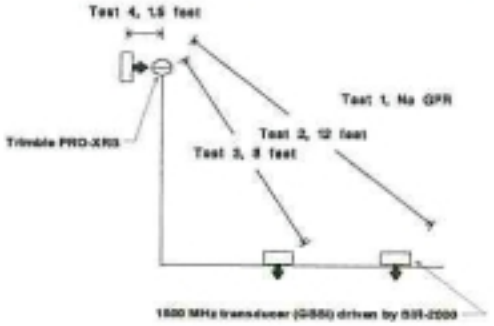
Test 3

trial	TTFF (sec.)
1	33
2	33
3	33
4	28
5	32
Average	31.8
Sigma	2.2

Test 4

trial	TTFF (sec.)
1	33
2	30
3	35
4	33
5	33
6	34
Average	33
Sigma	1.7

GPR/GPS Lock-on Test Layout



Summary

- GPR saves lives and promotes Public Safety and National Security
- GPR services are provided primarily by Small Businesses
- GPR operations have no adverse impact on critical communication systems
- No one is served by elimination of GPR

Summary

- Regulations, as they stand, would:
  - Hamper Public Safety Efforts
  - Threaten National Security
  - Have the unintended consequence of putting a lot of businesses out-of-business
  - Create an unwieldy bureaucracy to handle the thousands of requests per month to use GPR
  - Impede Law Enforcement